

# No “one-size fits all”

Towards a principled approach for incentives in mobile crowdsourcing

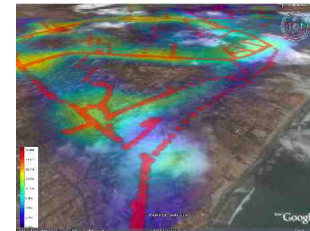
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# Background

- Mobile crowdsourcing
  - Participatory/mobile sensing
  - Mobile micro-labor
  - Traffic Monitoring



- Various requirements

- Spatial coverage
- Temporal response
- User attentiveness
- User participation
- ...

} Different applications weight them differently

# Incentives and mobile crowdsourcing

- Why incentives?
  - ↑ spatial coverage, user engagement, contribution
- Types in desktop crowdsourcing
  - Micro-payments
  - Beyond money
    - altruism, enjoyment, reputation
- Types in mobile crowdsourcing
  - Micro-payments
    - Micro-labor
  - Altruism and social rewards
    - Participatory sensing



***Ad-hoc, one-off solutions***

# Goal: Build a framework

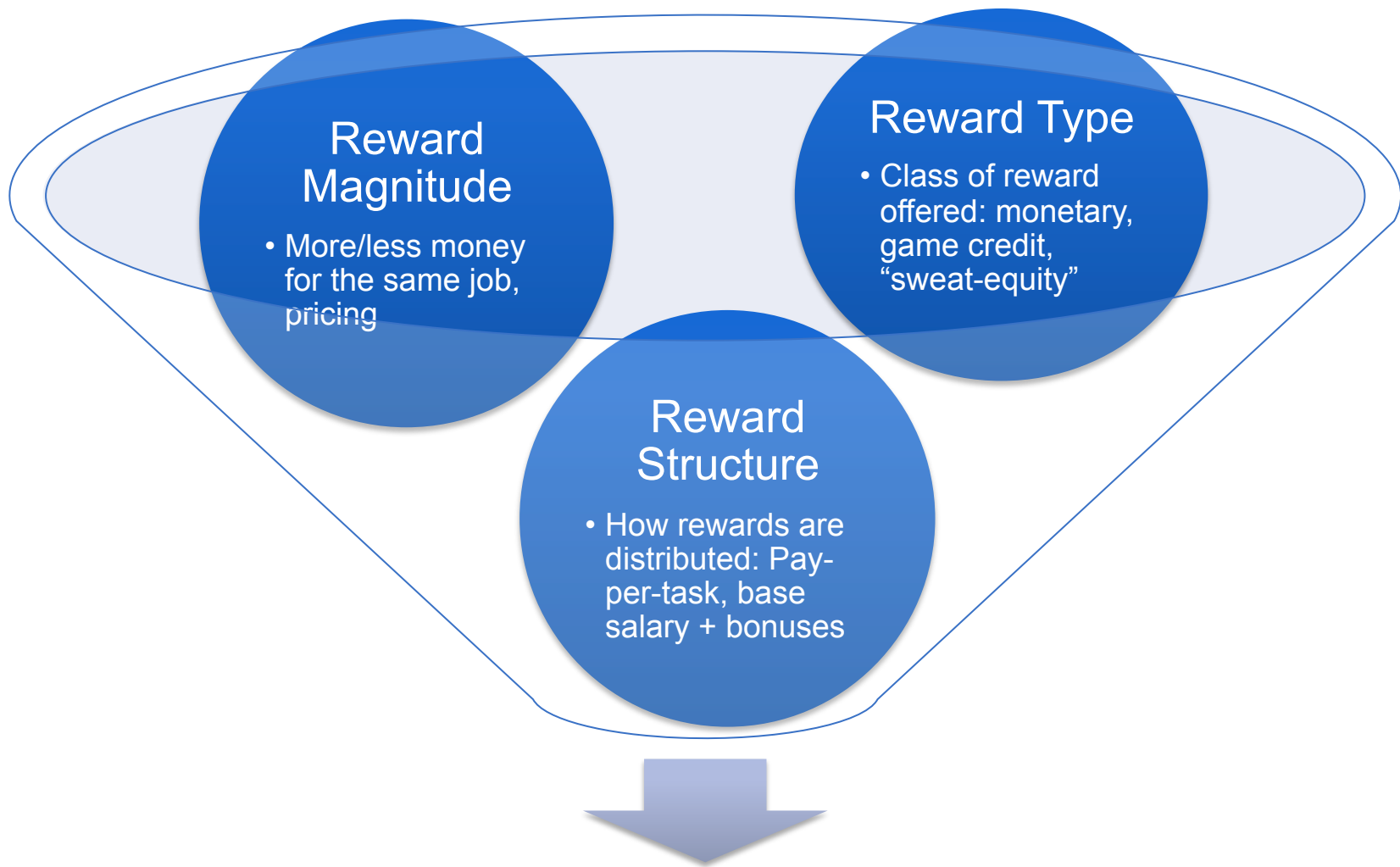
Compare and characterize incentive mechanisms

- *How to evaluate?*
- *Do users react differently?*
- *Tradeoffs?*
- *Best fit for application?*

## → This work

- Experimentally derive characteristics of two incentive structures that help answer these questions

# Dimensions of incentives



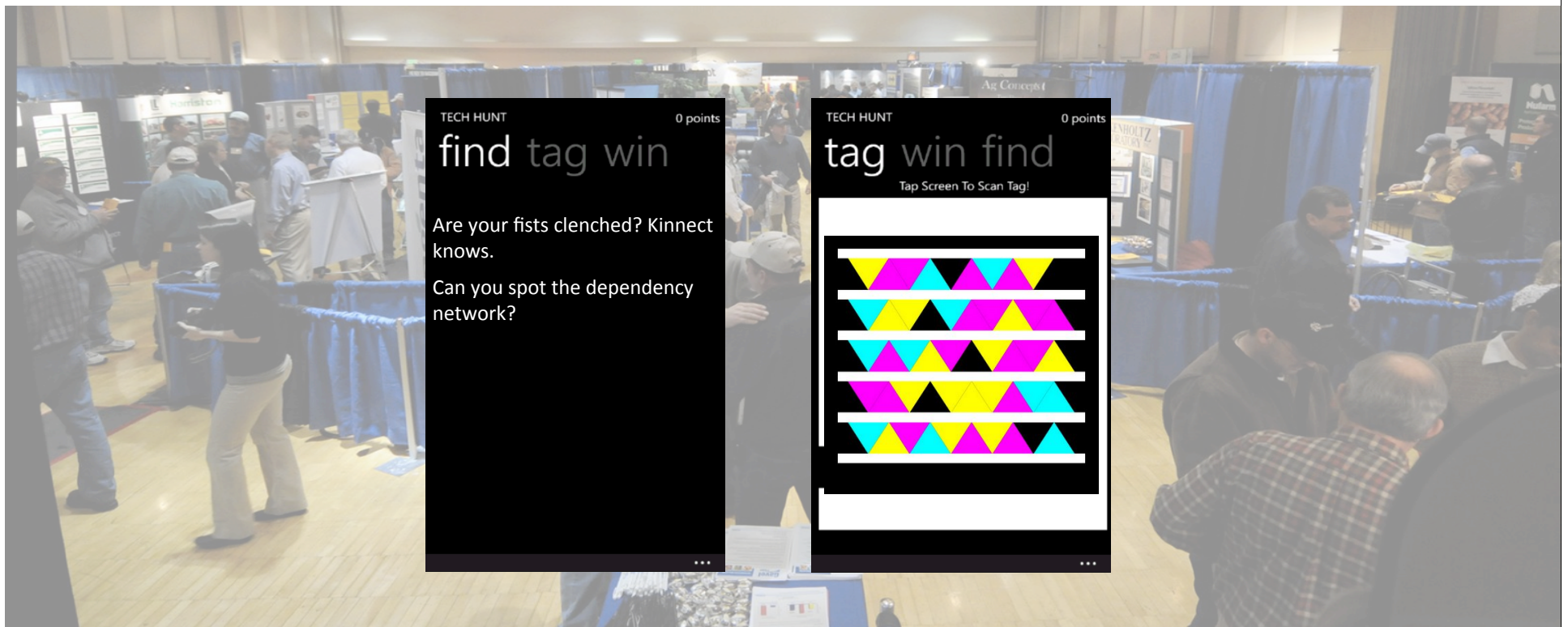
## Best Fit Incentive

# Experiment: Evaluate two incentives

- Micro-payments
  - Guaranteed payoff
- Weighted Lottery
  - High risk : High reward
  - 20 winners, limit one per user
- Varied only structure of reward
  - Chose one deterministic and one probabilistic incentive structure for comparison

# Experiment application

- Microsoft TechFest 2013
  - Two days, two 5-hour sessions, 151 booths, >3000 visitors
- 50 Phones – scavenger hunt application
  - 10 clues → Match clues to booths
  - Scan booth's 2D barcode to complete



# Measuring impact of structures

1. Recruitment – Attracting users to campaign
2. Compliance – Users completing tasks correctly
3. User-Effort – Amount of effort/time users are willing to put into each task



# Results preview

- Micro-payments
  - Fewer, more productive users
- Weighted Lottery
  - More total tasks, less individual effort

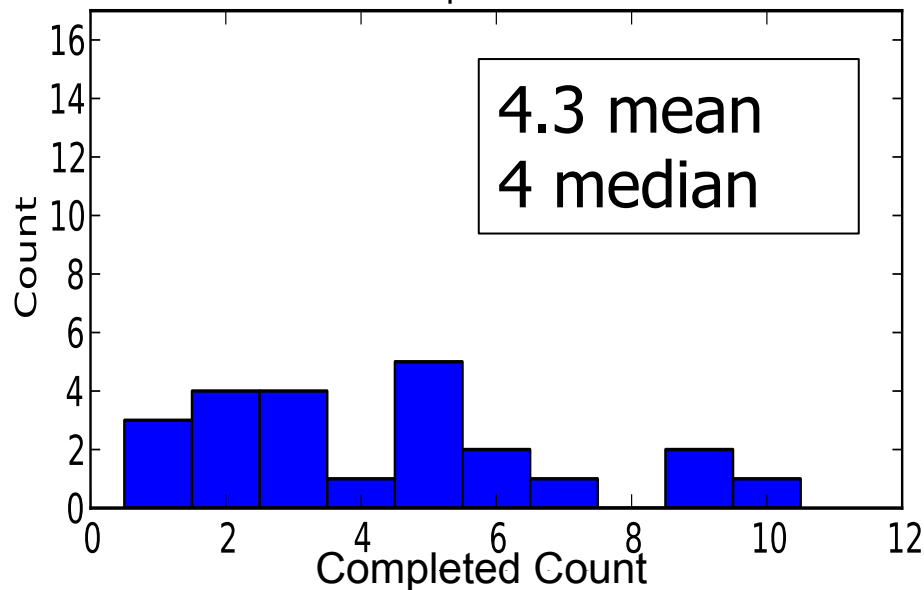
# 1. Recruitment: greater with weighted lottery

- Micro-payments
  - Lower overall recruitment
    - Recruited 39 participants
    - 23 active participants
  - Lower expected payout
  - Lower willingness to participate
- Weighted Lottery
  - Higher recruitment
    - Recruited 57 participants
    - 39 active participants
  - Lure of low cost/high reward
    - Expected payouts favorable given low initial effort

## 2. Compliance:

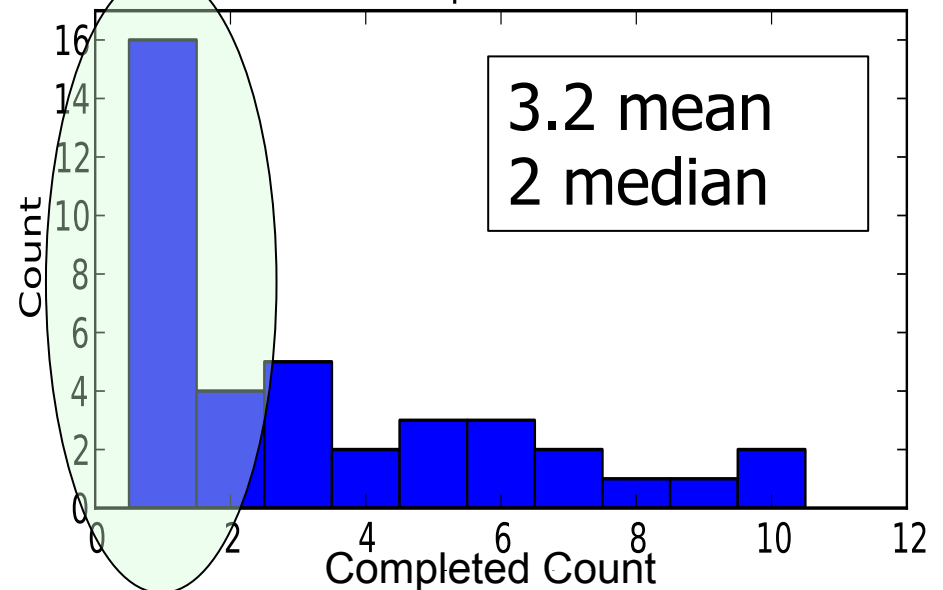
- Micro-payments
  - 99 completed
  - Each user completed twice the number than weighted lottery (median)

# of Completed Missions



- Weighted Lottery
  - 120 completed
  - Fewer tasks completed per user

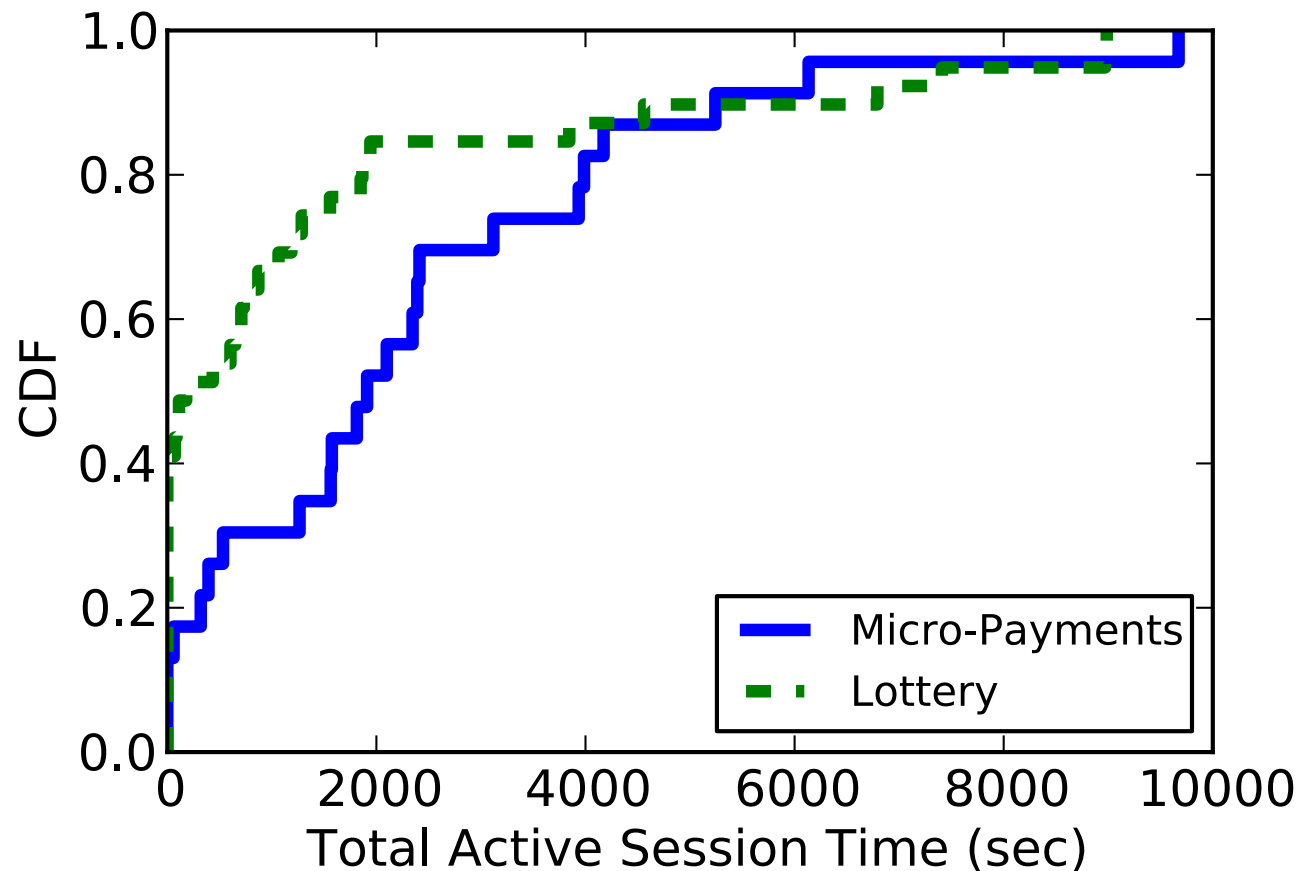
# of Completed Missions





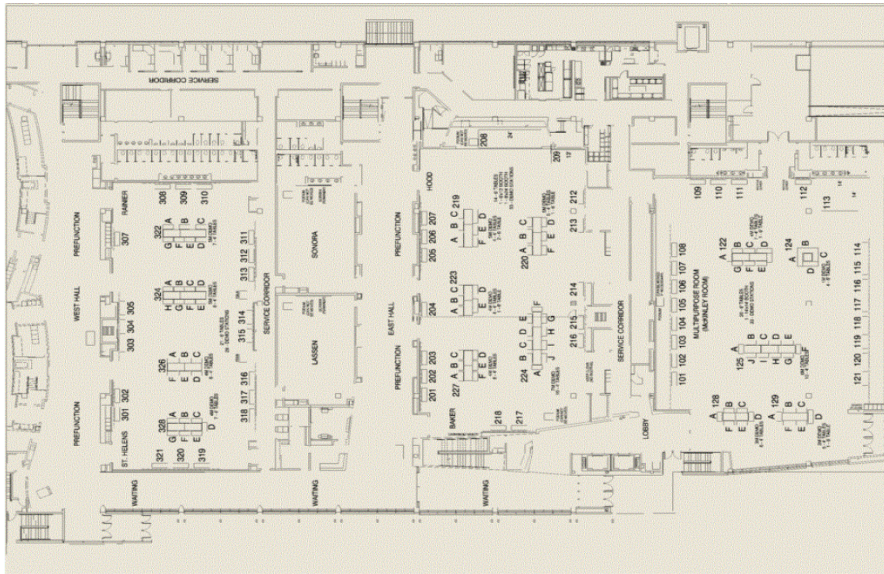
### 3. User-effort: micro-payments=more engaged

- Time between first and last completed task
  - Most weighted lottery participants had much shorter active sessions

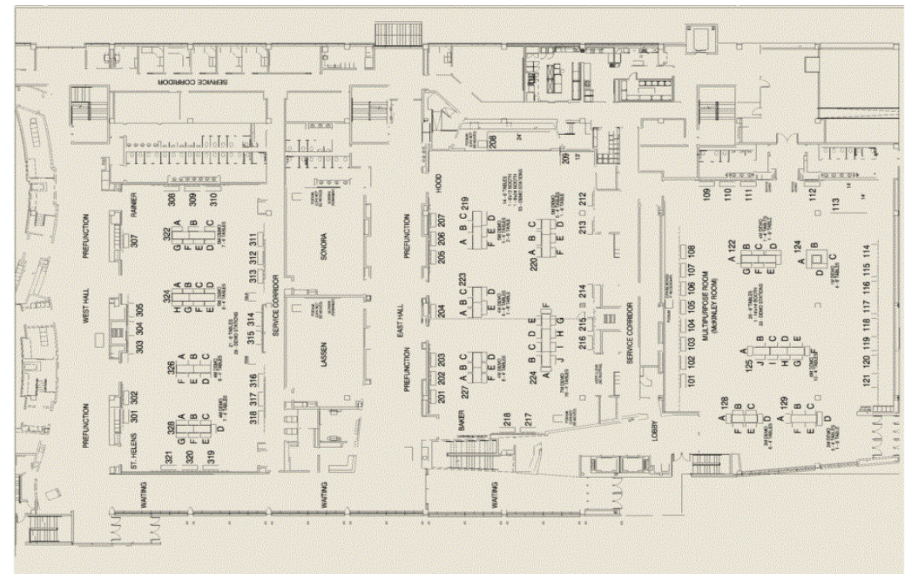


# 3. User-effort: spatial coverage

## Micro-payments

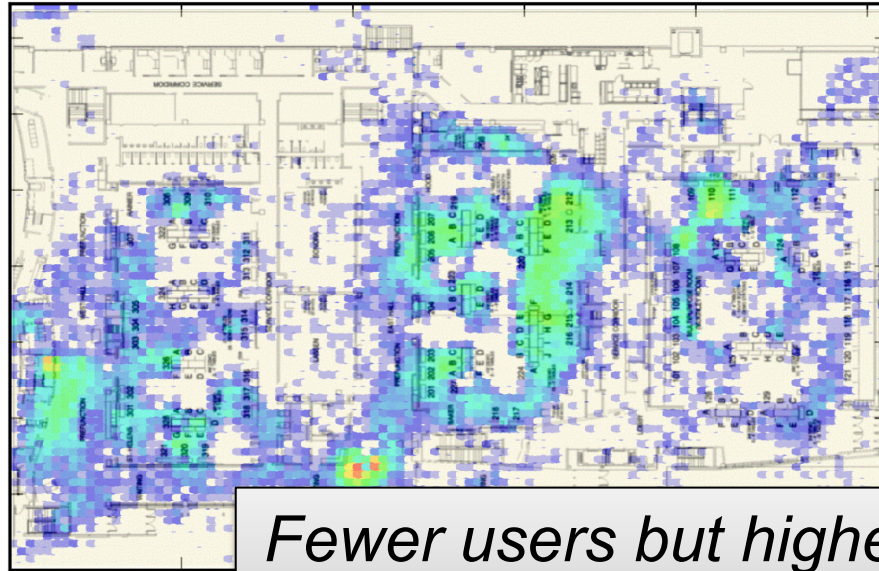


## Weighted lottery



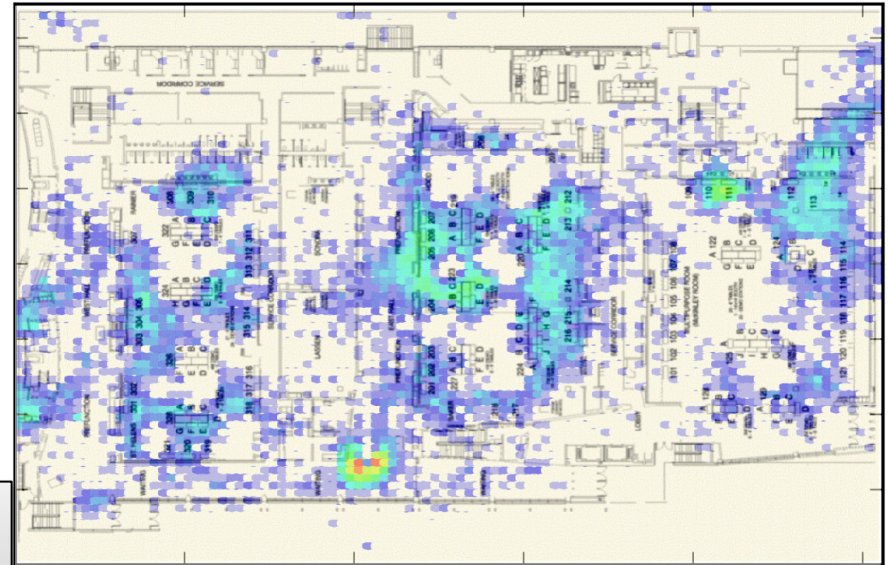
# 3. User-effort: spatial coverage

## Micro-payments



*Fewer users but higher Coverage!*

## Weighted lottery



# Results summary

- Weighted Lottery
  - More total tasks, more users, less individual effort
- Micro-payments
  - Fewer, more productive users



# Discussion and Future Directions

- Further understand role of incentives for behavior change
  - Humans becoming integral parts of mobile system performance
- Incentive choice affects different aspects of user behavior
- Larger study for further characterization

Thank you!